

BRIEF INTRODUCTION TO ELECTRICITY SECTOR IN VIET NAM

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I. OVERVIEW OF VIETNAM ELECTRICITY SECTOR.

A. EVN – Electricity of Vietnam

Established in 1994

1. Main responsibility

- Invest and develop power generation plants and network
- Produce and supply Electricity to the whole country

2. EVN – Structure

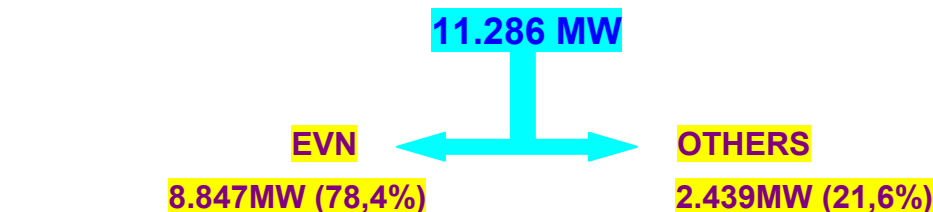
- Staff : 80.000
- Subsidiary companies and units : 56

3. Power Supply situation

- + for provinces : 100%
- + for districts : 98%
- + for villages : 95.4%
- + for households : 88.5%

B. PRESENT SITUATION OF VIETNAM POWER SYSTEM (2005)

1. Total installed capacity:



in which:

- Hydropower : 4198 MW (36,5%)
- Coal-fire TP plants : 2090 MW (18,5%)
- Gas-fire TP plants : 4503 MW (40%)
- Diesel and others : 495 MW (5%)

2. Energy output: 53.5 x 10⁹ kWh

3. Energy production per capita: 550 kWh

4. Transmission network:

- * 500 kV : 2469 km
- * 220 kV : 4795 km
- * 110 kV : 9817 km

II. POWER DEMAND AND POWER GENERATION DEVELOPMENT PLAN

1. Power demand for cast up to 2020

	2005	2010	2015	2020
Installed capacity (MW)	11,286	26,000	42,000	62,000
Energy production (106kWh)	53.5	113	190	294
Commercial energy production (106kWh)	45.6	97	165	257
Commercial energy production per capita (kWh)	550	1,106	1,774	2,629

EVN duty:

- + Put into operation 3.000 MW new capacity
per year for stage 2005-2010
- + 3.200 MW/year for stage 2010-2015
- + 4.000 MW/year for stage 2015-2020

2. POWER GERENATION DEVELOPMENT PLAN (Basic Alternative)

YEAR	2010	2015	2020
HYDRO POWER	10.200 (Other from EVN ~2.000 MW) (40%)	15.278 (36%)	16.578 (27%)
Gas Fuel Thermal Power Plants	16.000	13.624	15.064
Coal fuel Thermal Power Plants		9.290	20.890
Imported		2.695	4.756
New Energy		1.130	1.700
Nuclear Power Plants			3.000
Total	26.000	42.000	62.000

As planned up to 2020, 87% hydropower potential will be used

III. HYDROPOWER POTENTIAL IN VIETNAM

1. Natural conditions

- Area 328.000 km²; 4/5 mountains and highlands
- Mean annual rainfall : 2.000 mm
- In Vietnam: 2.400 rivers with the length of 10 km and longer
- Most of the rivers run into the East Sea with about 870km³ water volume annually (37.500 m³/s in discharge)

2. Hydropower potential

- Theoretical potential: 300 x10⁹ kWh
- Technical potential: 123 x10⁹ kWh
- Technical – economical: 75 ÷ 80 x10⁹ kWh (1.800 -2.0000 MW)
- At present: 20% potential is in utilization
(4.200 MW and 18 x10⁹ kWh)
- Potential of Small Hydropower ≤ 30 MW is about 300 projects (total of 2.000 – 3.000 MW and 8 – 10 x10⁹ kWh)
- Pump storaged projects: At present 10 projects are specified with 10.000 MW in which one project 1.200MW put in operation in 2018–2020 an one 1.000 MW in 2020 – 2025

River basins location shown in the map below

HYDRO POTENTIAL OF MAIN RIVER BASINS

	River Basins	Catchment Area (km ²)	Capacity (MW)	Gen. (TWh)
①	Lo-Gam	17,200	1090	4,025
②	Da	52,500	6756	30,69
③	Ma-Chu	28,400	1087	4,00
④	Ca	27,200	416	1,484
⑤	Vu Gia	10,500	1359	4,965
⑥	Ba	13,800	669	2,60
⑦	Sesan	11,450	1796	7,32
⑧	Srepok	12,200	650	2,85
⑨	Dong Nai	17,600	2925	11,50
			16748	69,43

IV. HYDROPOWER PLANTS IN OPERATION AND UNDER CONSTRUCTION

1. Hydropower plants in operation.

- 11 plants
- Total installed capacity 4,198 MW :

Hoa Binh	1920 MW	Yaly	720 MW	Tri An	400 MW
Ham Thuan	300 MW	Da Mi	175 MW	Da Nhim	160 MW
Thac Mo	150 MW	Thac Ba	108 MW	Can Don	78 MW
Song Hinh	70 MW	Vinh Son	66 MW	Small Hydro	50 MW

River basins location shown in the map below

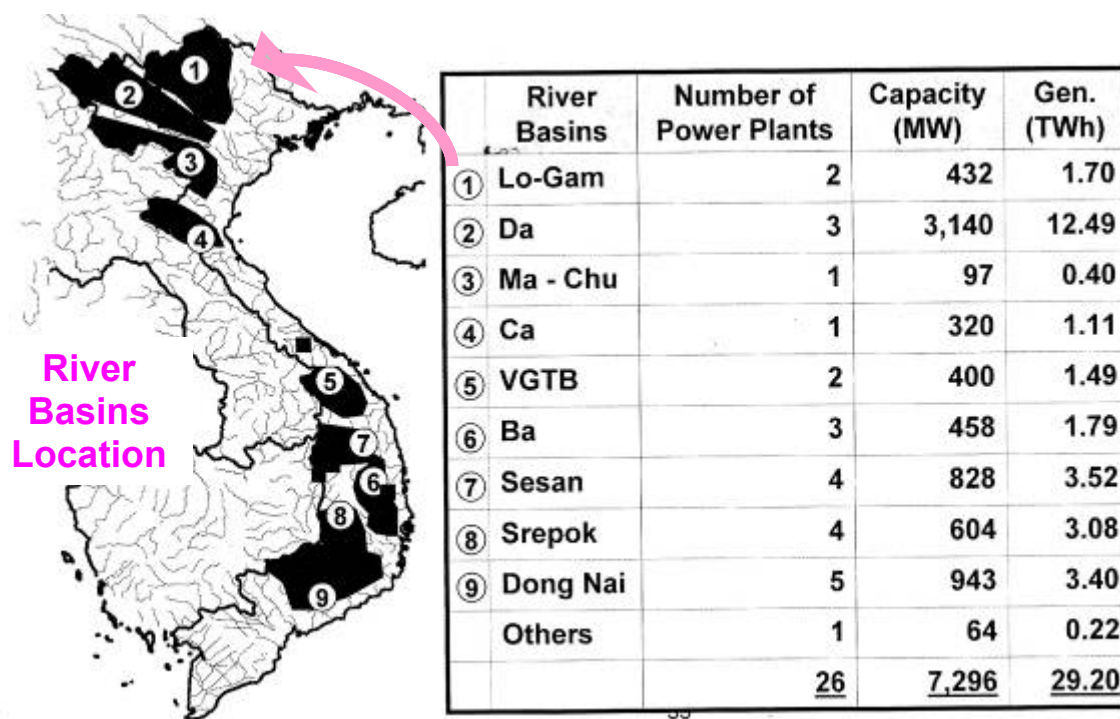
	River Basins	Number of Power	Capacity (MW)	Gen (TWh)
①	Lo-Gam	1	120	0.4
②	Da	1	1,920	9.13
⑥	Ba	1	70	0.36
⑦	Sesan	1	720	3.65
⑨	Dong Nai	6	1,1257	5,22
	Other	1	66	0.23
		11	4,153	18.06

2. Hydropower projects under construction

At present there are 20 projects of EVN under construction in which Son La HPP's (2400MW) unit 1 and 2 will be put into operation in 2010 and complete in 2012

- Domestic IPP, BOT, BOO projects with 1000 MW put into operation up to 2010
- 300 – 380 MW small hydro (<30m) put into operation in period of 2006 – 2010

No	Project name	Province	Capacity (MW)	Dam type	Dam height (m)
1	Tuyen Quang	Tuyen Quang	342	CFRD	93
2	Son La	Son La	2,400	RCC	138
3	Huoi Quang	Son La	520	RCC	130
4	Ban Chat	Lai Chau	220	RCC	104
5	Ban Ve	Nghe An	300	RCC	136
6	Quang Tri	Quang Tri	64	CFRD	75
7	Song Tranh 2	Quang Nam	190	RCC	95
8	Song Ba Ha	Phu Yen	220	Earth fill	60
9	Kanak – An Khe	Gia Lai	173	CFRD	64
10	A Vuong	Quang Nam	210	RCC	82
11	Dong Nai 3	Lam Dong	240	RCC	100
12	Dong Nai 4	Lam Dong	270	RCC	128
13	Dai Ninh	Lam Dong	300	Rock fill	50
14	Bac Binh	Binh Thuan	33	Earth fill	25
15	Buon Tou Srah	Dac Lac	86	Rock fill	85
16	Buon Kuop	Dac Lac	280	Earth fill	30
17	Srepok 3	Dac Lac	220	Rokfill	60
18	Pleikrong	KonTum	110	RCC	71
19	Sesan 3	Gia Lai	260	RCC	70
20	Sesan 4	Gia Lai	330	RCC	74



V. ELECTRIC NETWORK CONNECTING PLAN BETWEEN VIETNAM AND NEIGHBOUR COUNTRIES

1. With Laos

At present:

- 220 kV Line from Nam Mo Hydro Plant (100MW) – Ban Ve – Vinh
- 220 kV Line from Sekamas 3 Hydro Plant (250MW) –
A Vuong Hydro Plant – Da Nang

In future:

- Import energy from Laos with 1000MW up to 2010 and 2000MW afterwards
- Planned 500kV transmission line network
- From Central Laos to Ha Tinh Province (Nam Thom Hydro 2688MW)
- From South Laos to Pleiku (Sekamas 1, Sekong 4-5, Nam Kong Hydro 1600MW)

2. With Cambodia

- Period 2008 – 2010: Power supply from Vietnam to Cambodia with 150-200MW by 220kV from Chau Doc to Ta Keo and Phnom Penh
- Period 2015 – 2016: in case of that Lower Se San & Lower Srepok Hydropower Plants (430MW) in Cambodia will be built, energy will be supplied to Ho Chi Minh City

3. With China

- In 2006 import 250-300MW via 220kV Lao Cai – Yen Bai – Viet Tri
- In 2007 import 250-300MW via 220kV Ha Giang – Thai Nguyen

- Plan to import 1500MW in period of 2006-2018 by 500/220kV from Hong Ha to Soc Son

VI. POLICY ON FINANCING ISSUE FOR POWER DEVELOPMENT IN VIET NAM

- **Speed up privatization process within EVN.**
Transferring power plants, power companies and other companies into joint stock companies
- **Bond issue**
- **Domestic credit**
- **International credit**
- **Diversification of different financing sources**

(presentation at the “ASIA 2006” Symposium)